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|--------------------------------------------------------------------------------------|-------------|-----------------------|----------------------------------|------------------|
| APPLICATION NO.                                                                      | FILING DATE | FIRST NAMED INVENTOR  | ATTORNEY DOCKET NO.              | CONFIRMATION NO. |
| 10/685,070                                                                           | 10/13/2003  | Mohammad R. Haghighat | 42P17567                         | 4351             |
| 59796                                                                                | 7590        | 03/30/2007            |                                  |                  |
| INTEL CORPORATION<br>c/o INTELLEVATE, LLC<br>P.O. BOX 52050<br>MINNEAPOLIS, MN 55402 |             |                       | EXAMINER<br>GORTAYO, DANGELINO N |                  |
|                                                                                      |             |                       | ART UNIT<br>2168                 | PAPER NUMBER     |
| SHORTENED STATUTORY PERIOD OF RESPONSE                                               |             |                       | MAIL DATE                        | DELIVERY MODE    |
| 3 MONTHS                                                                             |             |                       | 03/30/2007                       | PAPER            |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/685,070             | HAGHIGHAT ET AL.    |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Dangelino N. Gortayo   | 2168                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 13-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The amendment filed 1/10/2007 have been received and entered. Claims 13, 15, 18, and 21 have been amended. Claims 13-27 are now pending.

### ***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 13, 15, 18, and 21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 13, 15, 18, and 21 are rejected because it does not produce a concrete, tangible, or useful result. For an invention to be statutory, an invention must disclose a "useful, tangible, and concrete result". The claimed invention as a whole must be useful and accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96 (1966)); In re Fisher, 421 F.3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); In re Ziegler, 992 F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)).

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Claim 13 recites the limitations “ensuring”, “preventing”, and “coordinating”. The claim fails to produce a tangible result, as these are passive words that fail to cause a computer to do anything. The steps merely insures that the stated action occurs, and nowhere in the independent claim. Rather, the instructions coordinate data, and fail to produce any type of result. Proper correction is required.

Claim 15 recites the limitation “the second instructions permit a first one of the multiple threads to add”. This limitation is absent a recitation of any step for causing a computer to do anything; instead the limitation just ensures there is no code or steps that prohibit it. There does not appear to be a useful, concrete and tangible result for this claim.

Claim 18 recites the limitation “the third instructions permit one of the multiple threads at a time to add”. This limitation is absent a recitation of any step for causing a computer to do anything; instead the limitation just ensures there is no code or steps that prohibit it. There does not appear to be a useful, concrete and tangible result for this claim.

Claim 21 recites the limitation “facilitating multiple concurrent threads” by “permitting modification of an element”. This limitation is absent a recitation of any step for causing a computer to do anything; instead the limitation just ensures there is no code or steps that prohibit it. There does not appear to be a useful, concrete and tangible result for this claim.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 13-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Alverson et al. ("Alverson" US Patent 6,862,635 B1).

As per claim 13, Alverson teaches "A tangible machine readable medium,"  
(column 20 lines 20-24)

"comprising: first instructions for ensuring that a data element is not added to a data structure if that data element is already present in the data structure;" (column 9 lines 21-28, column 11 lines 31-51, and column 12 lines 25-45, wherein a trap handler stores a pointer to a waiter data structure as the value in the blocking word, and the trap handler is checked to see if the blocking word is accessed, checking the pointer data)

"second instructions for preventing multiple threads from adding a common data element to the data structure;" (column 9 lines 21-34, column 10 lines 1-6, and column 13 lines 15-33, wherein a linked list of waiter data queues multiple threads that seek access to a common word, or location, of memory representing a data element)

“and third instructions for coordinating among multiple threads adding different data elements to a common location in the data structure.” (column 16 lines 20-34, wherein a data buffer coordinates the addition of data items to memory)

**As per claim 14, Alverson** teaches “the first instructions area arranged to be executed by a machine before the second and third instructions.” (column 13 lines 6-14, wherein the trap handler executes before adding items)

**As per claim 15, Alverson** teaches “the second instructions permit a first one of the multiple threads in time to add the common data element to the data structure and prevent subsequent ones of the multiple threads from adding the common data element.” (column 13 lines 28-36, wherein a bucket ensures a first stream adds data sequentially to memory)

**As per claim 16, Alverson** teaches “the second instructions include an atomic operation that is executable by only one thread at a time.” (column 13 lines 50-53)

**As per claim 17, Alverson** teaches “the an atomic operation is a compare and exchange operation.” (column 13 lines 42-46, wherein a fetch and add operation is executed)

**As per claim 18, Alverson** teaches “the third instructions permit one of the multiple threads at a time to add its different data element to the common location in the data structure and prevent other ones of the multiple threads from adding their different data elements at the time.” (column 15 lines 25-34, wherein access is synchronized by the buffer)

**As per claim 19, Alverson** teaches “the third instructions repeat until all of the multiple threads have added their different data elements to the common location in the data structure.” (column 16 lines 33-35)

**As per claim 20, Alverson** teaches “none of the first, second, and third instructions cause a deadlock between multiple threads.” (column 13 lines 52-67, wherein contention is avoided)

**As per claim 21, Alverson** teaches “A method, comprising: preventing multiple concurrent threads from adding a same element to a data structure;” (column 9 lines 21-34, column 10 lines 1-6, and column 13 lines 15-33, wherein parallel list access techniques allows multiple streams to add data to a list of items to be placed in memory without contention, through a linked list of waiter data queuing multiple threads that seek access)

“and facilitating faster execution of multiple concurrent threads that are adding different elements to the data structure by permitting modification of an element that was added by one of the multiple concurrent threads by another one of the multiple concurrent threads.” (column 13 lines 15-33, wherein parallel list access techniques allows multiple streams to add data to a list of items to be placed in memory without contention)

**As per claim 22, Alverson** teaches “preventing one thread of the multiple concurrent threads from adding an element to the data structure that is already in the data structure.” (column 12 lines 37-45)

**As per claim 23, Alverson** teaches “the data structure is a linked list, and wherein the preventing and facilitating are implemented using pointers of data elements.” (column 15 lines 5-14, wherein a linked list with pointers is used)

**As per claim 24, Alverson** teaches “ the preventing includes: determining whether the same element is already associated with the data structure,” (column 12 lines 25-37)

“precluding one of the multiple concurrent threads from adding the same element if the determining determines that the same element is already associated with the data structure,” (column 14 lines 18-23)

“and adding the same element to the data structure if the determining determines that the same element is not already associated with the data structure,” (column 14 lines 23-33)

“wherein the determining, the precluding, and the adding are performed in an atomic manner for each thread of the multiple concurrent threads.” (column 13 lines 50-53)

**As per claim 25, Alverson** teaches “the facilitating includes: adding a first element to a location in the data structure by a first thread of the multiple concurrent threads,” (column 13 lines 42-48)

“and adding a second element to the location in the data structure by a second thread of the multiple concurrent threads, thereby moving the first element within the data structure.” (column 13 lines 48-50)

**As per claim 26, Alverson** teaches “any one of the multiple concurrent threads may be suspended or terminated without deadlocking others of the multiple concurrent threads.” (column 13 lines 52-67, wherein contention is avoided)

**As per claim 27, Alverson** teaches “the preventing and the facilitating are based on a pointer field in the elements.” (column 14 lines 1-9, wherein a value in the parallel list is used)

### ***Response to Arguments***

6. Applicant's amendment, see page 7, filed 1/11/2007, with respect to the rejection of claims 13 under 35 USC 101 have been fully considered and are not persuasive. While the amendments to the claims overcomes the non-statutory category rejection in regards to the computer readable medium being non-statutory, Independent claims 13 and dependent claims 15, 18, and 21 are still non-statutory because they fail to produce a tangible result. The argument put forth by the representative addresses the usefulness of a result from said claims, but the claims still fail to produce a tangible result that a user can use and manipulate. The limitations of “ensuring” and “preventing” are passive terms, merely indicating that there is no code that prohibits the action from occurring. Nowhere in the claims is a tangible result produced by the outlined limitation.

7. Applicant's argument, see page 7, filed 1/11/2007, with respect to the rejection of claims 15, 18, and 21 under 35 USC 112, second paragraph have been fully considered and are persuasive.

8. Applicant's arguments with respect to the 35 USC 102(e) rejection of claims 13-23 have been fully considered but they are not persuasive.

a. Applicant's argument, in regards to claim 13, is stated as Alverson fails to disclose checking whether a data element to be added is already present in the data structure, and that a data structure is not present.

In regards to the argument, Examiner respectfully disagrees. In column 9 lines 21-28, a trap handler stores a pointer to a waiter data structure as the value in the blocking word, and the trap handler is checked to see if the blocking word is accessed, checking the pointer data. There contains in a waiter data structure a pointer to a data element, which is a value in memory. While being a location, its contents are still present in memory and comes to represent a data element. The check done by a trap handler checks to see if the location, as specified by different threads, is already filled. Checking a word, or location, of memory would mean that a thread or multiple threads are checking for already specified or reserved data in memory. Additionally, the method of writing to memory by multiple threads can be traversed through various data structures in column 15 lines 8-13. Therefore, Alverson teaches checking whether a data element to be added is already present in the data structure, and also that a data structure is present.

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b. Applicant's argument, in regards to claim 13, is stated as Alverson fails to disclose either a common data element or preventing multiple threads for adding such a common data element to the list.

In regards to the argument, Examiner respectfully disagrees. The reference as disclosed teaches that multiple threads can try to access a common word of memory, and that this is prevented when a trap handler detects an exception (column 9 lines 21-28 and column 10 lines 1-5). The multiple threads all point to a common memory location, and it would stand to reason that the memory location contains a value that wouldn't change for each thread. The word of memory is also made up of a unique 64-bit value and a 4-bit access state, meaning each word of memory is uniquely used to identify a specific data element (column 5 lines 34-41). Therefore, Alverson teaches a common data element and preventing multiple threads for adding such a common data element to the list.

c. Applicant's argument, in regards to claim 21, is stated as Alverson fails to disclose a same element or preventing multiple threads from adding the same element to the list.

In regards to the argument, Examiner respectfully disagrees. The reference as disclosed teaches that multiple threads can try to access a common word of memory, and that this is prevented when a trap handler detects an exception (column 9 lines 21-28 and column 10 lines 1-5). The multiple threads all point to a common memory location, and it would stand to reason that the

memory location contains a value that wouldn't change for each accessing thread. The word of memory is also made up of a unique 64-bit value and a 4-bit access state, meaning each word of memory is uniquely used to identify a specific data element (column 5 lines 34-41). As outlined in column 13 lines 24-37, the serial list is being used as something that is made more efficient through a parallel list. The same element is the word, or location, of memory that contains a value pointing to the address of the list. Therefore, Alverson teaches a same element and preventing multiple threads from adding the same element to the list.

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dangelino N. Gortayo whose telephone number is (571)272-7204. The examiner can normally be reached on M-F 7:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim T. Vo can be reached on (571)272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dangelino N. Gortayo  
Examiner

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